What Are Consulting Services Worth?
Applying Cost Analysis Techniques to Evaluate Effectiveness


ABSTRACT
Occupational health nurse consultants, whether internal or external to the organization, must document the benefit and effectiveness of services provided. In today’s business environment, it is imperative that occupational health nurse consultants demonstrate their contribution to the corporate business mission and goals. Both qualitative and quantitative methods provide appropriate techniques that can be used for this purpose. These techniques measure value in monetary terms such as cost-benefit and cost-effective analysis tools, as well as through interviews, focus groups, and case examples. Regardless of how skillfully a service is provided, the value must be demonstrated, documented, and effectively communicated.

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occupational health nurse consultants have the knowledge and skills to improve employee well-being, work conditions, and business cost drivers. Whether the occupational health nurse is hired as an internal or external consultant, it is not enough to talk about perceptions of occupational health service value. It is imperative that nurses demonstrate the value of their services. In today’s globally competitive business environment, companies search for ways to control costs and improve outcomes. Occupational health nurse consultants must demonstrate their value as key players in both. This demonstrated value requires not merely performing the roles and responsibilities to the highest quality standards, but also documenting and communicating the outcome of services delivered.

No matter the role, applying a process to deliver quality services and methods to demonstrate valuable outcomes is essential. These methods should involve both qualitative and quantitative evaluation tools, including collecting evidence of client satisfaction and outcome examples, as well as value-added and cost savings results.

This article presents methods, including cost analysis strategies, to assist the occupational health nurse consultant in demonstrating the value of services provided. The information is beneficial to both external and internal occupational health nurse consultants. The critical questions to ask are what are the benefits of the services provided and how can the benefits best be demonstrated and communicated?

REFLECTING ON THE PAST AND THE PRESENT
It is interesting to reflect on how a consulting company did business in the mid 1990s, when this article was originally published, compared to today. Although justifying costs and addressing return on investment (ROI) certainly remain important, the focus today should also include a substantial qualitative approach to measuring effectiveness and evaluating both individual and organizational well-being outcomes based on services provided.
What the authors have learned is that being true to core values and the business mission is paramount. Occupational health nurse consultants are committed to assisting companies remain successful through the mission of improving workplace health. With this in mind, consultants value people first. In honoring this basic principle, the value of services cannot be measured through cost savings alone. The measures also include contributions to improving the well-being of employees and ultimately improving the well-being and success of the organization. Can this be measured? Occupational health nurse consultants believe so. Improvements in the well-being of individuals and organizations can be demonstrated through workplace social climate change, employee engagement, attrition rates, perception of well-being, and innovations—all of which can result in financial gains and cost savings.

### THE COST OF DOING BUSINESS

Although terms have changed from “right sizing” to “lean manufacturing” and from “re-engineering” to “reorganization,” businesses continue to restructure to survive in today’s competitive global business environment. The bottom line is management continues to search for cost control measures, and health care costs continue to drain corporate profits. The occupational health nurse consultant can make significant contributions, advising and recommending effective solutions to identified problems. The occupational health nurse consultant assists business and individual clients in solving problems and achieving goals. The role has been defined as anyone providing professional advice or services (Roy, 1997); this definition applies to both internal and external occupational health nurse consultants. Based on current occupational health nurse role descriptions, the consulting services may include direct care, wellness initiatives, case management, safety programs, or benefit advice (Mellor & St. John, 2007; Strasser, Maher, Knuth, & Fabrey, 2006). According to a recent survey by the Kaiser Family Foundation (2011), companies will pay nearly 9% more for employee health care benefits, with the cost of family coverage topping $15,000 per year. This research also indicates that a larger percentage of these costs will be passed on to employees, a greater dollar amount than wage benefits. Yet employees still only pay 28% of the total costs and the employer covers the rest of benefit costs. It is a significant cost to all parties no matter how the situation is assessed.

U.S. health care spending reached $2.1 trillion, or $7,026 per capita, in 2006 and is projected to top $2.7 trillion, about $8,650 per capita or roughly $1 of $6, in the economy (Catlin, Cowan, Hartman, & Heffler, 2008; Huffington Post, 2011). In addition, the costs of disabling injuries in the workplace topped $53.4 billion in 2008. These costs only reflect direct U.S. workers’ compensation costs, which average more than $1 billion per week (Liberty Mutual, 2010). According to Liberty Mutual statistics, the top five injury causes, overexertion, fall on same level, bodily reaction, struck by object, and fall to lower level, accounted for 71% of the total 2008 cost burden; all of these injuries are preventable.

Whether as an internal or external consultant, the occupational health nurse consultant can assist companies control health care, injury, and other business costs, such as absenteeism and retention. The business case for these services reaches far beyond health care cost control alone. Wellness and safety initiatives are foundational to companies competing in the global market as they strive to be socially responsible corporate citizens. Operating a socially responsible company includes caring for employees, investing in the human element. Considering other major business costs (i.e., attrition and lack of engagement), the demonstrated savings from effective personnel initiatives is far greater than health and injury treatment dollars alone. On the basis of the immediate distribution of information via social networking, companies can no longer afford not to invest in employees, including the provision of effective health and safety services. Occupational health nurse consultants are well prepared to provide services in this arena.

### TYPES OF SERVICES DELIVERED

According to the American Association of Occupational Health Nurses, Inc. (AAOHN) fact sheet, occupational and environmental health nursing is the specialty practice that provides for and delivers health and safety programs and services to workers, worker populations, and community groups (AAOHN, n.d.). Strasser et al. (2006) described occupational health nursing practice as “…a unique specialty focused on promoting, protecting, restoring, and maintaining workers’ health within the context of a safe and healthful work environment” (p. 14). This context matters and directly impacts the effective delivery of occupational health nursing services. According to the Occupational Safety and Health Administration (OSHA), occupational health nurses are registered nurses who independently observe and assess workers’ health status regarding job tasks and hazards. Both definitions combine the relationship between worker health and safety and a healthy and safe environment. Using their specialized experience and education, occupational health nurses recognize and prevent health effects from hazardous exposures and treat workers’ injuries and illnesses (OSHA, n.d.). Potential cost savings can be gained from maximizing employee productivity and reducing costs through lowered disability claims, fewer on-the-job injuries, and improved absentee rates (AAOHN, n.d.) by influencing worker as well as workplace health.

### OCCUPATIONAL HEALTH NURSING ROLES

Both internal and external occupational health nurse consultants provide a variety of services. They validate the worth of those services as well as their contribution to the entire business. Assessing ROI should be possible when evaluating any of these services. In 2004, the American Board for Occupational Health Nurses, Inc. (ABOHN) sponsored a study to refine their certification examination and validate nursing roles and responsibilities for both certified and non-certified occupational health nurses working in a variety of settings (Strasser et
al., 2006). Respondents were asked to indicate the percent of time spent in each of five general role categories:
• Direct care (27.32%).
• Manager/Coordinator (22.14%).
• Case manager (21.13%).
• Educator/Advisor (14.25%).
• Consultant (9.29%).

In addition, safety (12.64%) and ergonomics (15.26%) ranked high for the estimated percent of time spent. Certainly, internal and external occupational health nurse consultants provide these services; cost savings and value can be determined for these categories. However, the lowest frequency and significance rankings included the following areas, for which occupational health nursing consultation could be of value to employees and the company: participating in design of employee benefit plans, designing and conducting formal research, evaluating benefit programs for employee health care delivery, and implementing an absenteeism control program. An interesting finding in a survey of Australian occupational health nurses by Mellor and St. John (2007) was that the nurses believed direct care would and should decrease to accommodate expanding roles (e.g., designing and implementing wellness programs).

ABOHN areas of service are used in this article as examples of demonstrating the worth of consulting services, specifically direct care including health surveillance, case management, and injury prevention using ergonomic principles. Comprehensive wellness services are also included because wellness is an area of interest for companies. When considering the worth of consulting services, it is necessary to identify when calculating ROI is appropriate and the data needed to do so. To evaluate outcomes and determine ROI, the occupational health nurse consultant must identify the issue of concern and desired outcome, determine measurable variables and available, accessible data, analyze outcomes, specify how the data will be used, and communicate or report results.

Provide Services That Target a Need
To begin, consider the issue of concern and how the services provided by the occupational health nurse consultant meet that need. In other words, identify the problem or make a nursing diagnosis and plan the best initiative to address the problem. The issue could be identified from trends noted in occupational health center visits, injury type, health trends including risk or cost increases, physical or social environmental issues, or regulatory compliance concerns. The occupational health nurse consultant often has access to a plethora of data and the pulse of issues impacting the business.

Once an issue is recognized, the occupational health nurse consultant must collaborate with others to confirm the issue identified and determine possible contributing factors. Many perspectives and perceptions of the problem and causes may be suggested. The desired outcome is dependent on these perspectives. The value of the service could be negated if no one perceived a problem, information or a perspective is missing, or other more pressing needs take precedent.

Although the concern may seem obvious, the problem statement, as well as how to measure it, may not be identical when articulated from different perspectives. Listening to a variety of perceptions is not only important but also necessary for success. Listening ensures input about values and priorities—essential information for clarifying the issue and considering the appropriate course of action. A line manager perceives safety issues in terms of lost days and productivity, whereas the on-site occupational health nurse perceives injury treatment and case management as the primary concerns. On the other hand, the benefits manager focuses on workers’ compensation costs. Although all of these perspectives are included in the analysis, the focus is clearly different depending on the specific perspective and how the information is communicated. A concise definition of the problem is necessary to determine the most effective solution.

For example, a client company requested health clearance for all employees providing janitorial services at a textile company. The manager’s objective was to avoid OSHA fines by including all employees in a respiratory program. After further assessment of the problem, the occupational health nurse consultant determined only a few employees needed health examinations. Other employees needed pulmonary function tests and respirator fit testing. In addition, through work process modifications, exposures were eliminated for the majority of employees.

The cost of the final health surveillance examination was approximately $4 per employee. Including the 2 hours of consulting time, the cost for the employer was reduced from $2,600 to $160 in direct costs, or a cost avoidance or cost savings of $2,440. The value in the case was efficiency and effectiveness as well as a more manageable program; however, cost analysis was not only feasible but demonstrated value. It also aligned with OSHA hazard control methods that encourage work practice and administrative controls before the use of personal protective equipment.

Interestingly, in contrast, another client company was applying for the OSHA Voluntary Protection Program (VPP). The VPP auditor misinterpreted the fact that all employees were in the hearing conservation program as a way to avoid OSHA fines without fully assessing the exposure problem. On further investigation, the company had completed annual assessments and although the regular work noise levels were well below the action level as the OSHA auditor noted, periodic noise exposure during emergency work definitely was above the permissible exposure level of 90 dBA time-weighted average. Consultation determined the miscommunication and the application proceeded on schedule. So how does one determine the worth of this service? Cost analysis is not applicable in this case; however, value lies in clarifying the rationale and establishing a collaborative relationship with OSHA to achieve the goal of VPP for this client. Without the consultation, the VPP application would have been aborted. The bottom line is that without identifying the real issue, the value would have been negated in both instances.
Identify the Desired Outcome

The second step in this framework is to determine the desired outcome(s) and a reasonable time frame for achieving the results. This step usually requires a longer-term engagement, a minimum of 3 to 6 months, and up to 1 to 3 years to ensure sustainability. For most initiatives, the financial ROI usually takes from 3 to 5 years. Services to consider for measuring worth could include any behavior, environmental, or culture change initiatives; a new service offered by the occupational health center; or an ongoing service provided by the center compared to a similar service offered in the community. Brief initiatives (e.g., a one-time activity such as a health fair, biometric screening, or safety training class; or awareness-level programs such as lunch-and-learns) are generally not adequate to demonstrate outcomes or ROI. However, these offerings may have a role within an overall program plan and be justified in terms of escalating awareness to increase participation in a behavior change initiative, for example. Once the outcome(s) are identified, the methods for determining worth can be planned.

Gather Necessary Data

Next, the anticipated outcome(s) must be measurable and credible data must be readily available or accessible to determine value and ROI. It is necessary to collect data or variables that are measurable. The measures may be before and after changes (e.g., reduced absenteeism, lower injury rates, and decreased health risks). Measuring outcomes is labeled impact evaluation because determining the impact of the initiative is desired. Impact data are not ROI; however, if the data demonstrate program gains, then an ROI can often be calculated. Depending on how best to document worth, outcomes or results may be enough to indicate success without analyzing the ROI. For example, results may indicate how many participants lost weight or lowered biometric indicators based on a 3- or 6-month initiative. However, the authors suggest using caution in relying on these short-term gains and advise longer-term monitoring before concluding value. Chenowith (2011c) describes this concern as inherent threats of short-term gains (e.g., novelty and the Hawthorne effects), as the gains may be just that—short-term. However, some programs, such as self-care and back injury prevention programs, can have rapid ROI (Chenowith, 2011c), especially if emergency department visits have been frequent or costly or several preventable back injuries were reported before either initiative began.

Nevertheless, it is better when communicating results to do so after longer initiatives or monitoring periods because a true outcome is often found at the end of 3 or 6 months. In other words, consistency and sustainability are needed to demonstrate program effectiveness, especially an ROI. For example, findings from a qualitative study suggest that participants in periodic wellness initiatives revert to baseline, or worse, in the weeks following the initiative (Mastroianni, 2012). The results were analyzed from interview data and journal notations of 19 participants employed at four companies that had won awards for their health promotion programs. Several participants in the study said that they only exercised or lost weight during the scheduled fitness challenge. Similar anecdotal stories were heard from other employees when discussing this finding. Their experience of weight gain and not exercising between fitness challenges corroborated the results. The only participant who maintained the health goal following a workplace initiative did so through a support group of coworkers. This group, or community of practice, added the needed sustainability and ongoing support to maintain weight loss and health practices.

The best advice is to ensure that consulting services provide valuable data. It is also important to be a savvy consumer of outside consulting services by assessing their actual success rate. The authors recall listening to a smoking cessation professional bragging about a 99% success rate during a continuing education presentation for occupational health nurses, only to discover that the rate was based on the smoking cessation status of participants when they left her office. She had absolutely no contact afterward to determine if participants remained smoke-free or began smoking again. On the other hand, the internal or external consultant may offer a program such as smoking cessation with limited success, only to learn that one or more participants quit smoking a few months after the initiative ended. Seeds are often planted and grow when the conditions are right. Communication and continuous monitoring capture the true success and impact that initiatives have on the problem of interest.

Collect and Maintain the Data

With this understanding, the occupational health nurse consultant must determine the data needed, the best strategies to obtain the data, and the time frame during which the data should be collected. It may be necessary to collaborate with other personnel from different departments to secure the needed information or decide how best to collect the data. For example, if the desired result is lowered absenteeism, the consultant may need to collaborate with human resources or line managers; if lowered emergency department costs is the goal, the benefits department may help; and if a safety initiative such as ergonomics or a behavior-based safety program is needed, perhaps the environmental health and safety department should be contacted. If the consultant wanted to determine the value of implementing a direct care program, injury treatment, or in-house audiometric testing, the occupational health center may have the comparative data.

The consultant must be familiar with direct and indirect costs when determining the data to collect. Direct costs are the actual out-of-pocket expenses related to the program or service, including health care expenses, materials, utilities, equipment, and marketing costs. Indirect costs are less tangible expenses such as lost productivity or retraining (Sidebar 1). An electronic spreadsheet or database with the desired data or variables and cost estimates is necessary at this step. Other data should include the number of participants reached and the number of participants who completed an initiative.
Plan Evaluation

Allow planning time for analyzing data. It is necessary to determine the client value and plan the evaluation accordingly. The client value may be the number of participants reached, participant satisfaction, behavior change, or cost savings. Evaluation does not necessarily require a significant amount of time, but a measure of outcomes desired by all stakeholders, including the occupational health nurse, management, and participants, is required. The focus should be on the quality of the intervention, with only 2% to 5% of the total program time spent on evaluation (Aldana, 2007). The authors recommend that both qualitative and quantitative approaches be considered. It is essentially a before and after story (Aldana, 2007)—where are employees today compared to when they started the program? The occupational health nurse consultant must plan for evaluation even before it is requested. Whether internal or external, the consultant must be prepared to justify the expense of services by successful outcomes, profits, and productivity.

The occupational health nurse consultant should use different levels of evaluation: process, impact, and outcome (Chenowith, 2011b). It is important to determine not only the desired outcome, but also the desired evaluation to demonstrate value. Process evaluation has two levels, perception and learning. Process addresses a mix of self-evaluation and participant and management perceptions of the service. At this level of evaluation, the consultant may interview key stakeholders, including participants, about their experience, or provide a survey that gathers participant perceptions. This level of evaluation is often referred to as the “smiley face” tool because it assesses likes and dislikes (i.e., what did and did not work from the stakeholders’ perceptions). Process evaluation is relatively easy to do and should be considered during initiative as well as immediately after completion.

The next level of process evaluation assesses if learning has occurred, measured by pre- and post-tests or surveys and before and after observations. This level also includes assessing the planning and implementation process by considering obstacles, staffing issues, materials used, and location. It also includes the number of participants reached, participants enrolled in the program, and participants completing the program.

At the impact level, the consultant analyzes changes in behavior variables and risk factors. Impact evaluation requires tracking data to compare before and after trends. The occupational health nurse consultant must determine if the service offered had an impact or achieved change. How and what is evaluated depends on the initiative. For example, if the issue and plan addressed reducing emergency department use, the consultant might determine whether a decrease in the number of visits to the emergency department occurred during the designated time period. If the initiative involved a health behavior such as weight loss, the consultant might assess the number of participants who completed the program and the amount of weight lost, or how many participants quit smoking, lowered blood pressure, or improved physical activity. If the consulting service was safety related, then the consultant would assess safe behavior changes, or, for example, client comfort following an ergonomic assessment. Qualitative data may be included with the quantitative data (e.g., anecdotal stories, quotes related to satisfaction and transformative changes).

The last evaluation level is the financial impact or outcome that includes an impact at the organizational level and ROI. These measures can be one in the same, but do not have to be. For example, is it acceptable within the culture of a company to report changes in injuries, health behavior, absenteeism, or retention? Or are the expectations to demonstrate ROI in cost savings, period?

Using cost analysis techniques to determine ROI challenges, the occupational health nurse consultant must clearly define the outcomes, options, and assumptions about the problem to reach a rational conclusion. In addition, determining ROI also requires methodical data collection and maintenance. As mentioned previously, ROI is appropriate and accurate for longer initiatives but not for one-time or awareness-level programs such as an employee health fair. The goals of health fairs are often to increase awareness about a variety of health and safety topics (primary prevention) and to screen participants (secondary prevention) to identify early stages of a health problem (e.g., hypertension, diabetes, or hyperlipidemia) before symptoms are apparent. Because employees gain knowledge about healthier lifestyles or identify an early stage of a health problem does not mean they will change behaviors or take steps to reduce risks. For example, if the health fair evaluation indicates employees increased knowledge about blood pressure or low-fat food choices, the occupational health nurse consultant cannot use these data to extrapolate a decreased risk of heart disease. In addition, identifying hypertensive employees at a health fair does not indicate that these employees will comply with prescribed treatments and lifestyle changes (e.g., weight loss and smoking cessation).

Determining the success with any of these health concerns requires long-term interventions and monitor-
ing. Through counseling and ongoing evaluation of compliance with prescribed care, the occupational health nurse consultant can document sustained health changes and lowered health risks. Then, by analyzing company insurance data to determine average costs for past employees with similar health risks and comparing the past average costs to current case(s) costs, the consultant may demonstrate reduced health care costs from the changes. The occupational health nurse consultant is then prepared to justify the service and future initiatives if the implementation costs are less than costs avoided or costs saved. These calculations require a basic understanding of cost analysis as a component of the evaluation process.

Cost calculators are available that may be beneficial when ROI is desired and are an appropriate tool to demonstrate the value of the consulting service. One, from Active Living Leadership, examines the cost of inactivity and can be accessed through the Wellness Council of America website (http://welcoa.org/news.php?entryid=91). Another, from the Centers for Disease Control and Prevention, calculates the cost of obesity (www.cdc.gov/leanworks/costcalculator/index.html). OSHA also has a Safety Pays calculator (U.S. Department of Labor, 2008) to determine cost savings from injury prevention. It is often difficult to quantify value or cost savings alone and thus demonstrate all of the value. By gathering anecdotal data along with quantitative data, the case for program sustainability is strengthened. As mentioned earlier, consultants can capture the stories and successes participants share, including quotes. Participants can be asked if the consultant can use their names or they can be invited to present their successes as part of a report to management (Aldana, 2007).

When determining the worth of services, the consultant should not be surprised. Programs should be evaluated for effectiveness before they end. Process and impact evaluation should be conducted throughout the intervention and revision should occur as necessary. This approach may result in eliminating certain services or totally changing how the services are offered. The consultant must be prepared for findings that may initially be disappointing. However, these findings provide direction for changes to services and focus energies on other, more worthwhile initiatives for the employees and the company. The authors recall a poster displayed years ago that noted if the value of a service cannot in some way be demonstrated, it is not worth doing, no matter how well the service was performed.

**Communicate Outcomes**

Finally, the consultant must communicate the results to all appropriate stakeholders. The preferred method of reporting and communicating outcomes should be determined in advance. The consultant must be prepared to write a summary report including charts and graphs or present the same to stakeholders. Some businesses expect both and others prefer an informal summary with a bulleted list of outcomes. The consultant should negotiate these expectations and plan value communication accordingly.

**DETERMINE OUTCOMES AND METHODS OF MEASUREMENT**

To recap, services are planned based on identified problems, issues, or needs; the desired outcomes; and the most appropriate methods to determine value. Specifically, the occupational health nurse consultant must clarify acceptable measures over an expected length of time. Once the measures are determined, cost analysis can be conducted. Two types of cost analysis tools frequently used are cost-benefit analysis and cost-effectiveness analysis. Although these tools can be confusing, understanding and using them is fundamental for the occupational health nurse consultant.

**Cost-Benefit Analysis**

Cost-benefit analysis compares the investment in, or cost of, a program to the worth or benefit of that program. The costs and benefits are both measured in monetary terms. Essentially, the comparison is used to demonstrate the benefit of a program via dollars in and dollars out, disregarding the qualitative or subjective value of the outcomes. Cost-benefit analysis considers both inputs and outcomes, converts them to a common monetary element, and then produces a cost-benefit ratio (Williams, 2008). The ratio is simple, dividing savings or profit by the cost of, or investment in, the service.

\[
\text{Amount saved} \div \text{Amount spent} = \text{ROI}
\]

The ratio is used to demonstrate an objective, quantifiable evaluation of a program in terms of dollars expended (costs) and dollars saved (benefit) while disregarding any subjective value judgments on the outcomes.

The greatest challenge in cost-benefit analysis is determining the dollar value of all the costs and savings associated with the project being evaluated. Historically, this has been, and continues to be, challenging when assigning cost values to qualitative items such as improving human lives. Welfare economics is the basis for much decision making in health care and focuses on maximizing resources in societies to improve social welfare. Ideally, welfare economics provides an objective analytical method, assuming the cost of all items can be determined. The concept is founded on two underlying assumptions. First, the social value of a project is the sum value of the project to the individual members of society, regardless of size. Second, the value is based on willingness to pay or market value (Williams, 2008).

Although gathering costs for each resource can be difficult, data are available from several sources. A range of costs can be used in the final analysis, which is sometimes the best solution. These same data can be used to determine cost-effectiveness, described later. As a secondary benefit, the data gathering can be used as an opportunity to educate decision-makers about the breadth of the occupational health nurse’s capabilities.

The monetary figures used in the analysis should include both direct and indirect costs. Direct costs, which are usually the easiest to determine, are the ac-
tual costs related to the program. These costs are often considered out-of-pocket expenses. Indirect costs are more difficult to determine and are often overlooked for that reason. Examples of indirect costs might include loss of employee productivity, administrative costs in hiring new personnel, absenteeism, or presenteeism (Table 1).

Cost-Benefit Analysis: Ergonomic Assessment Example

When all program costs and benefits have been determined, the cost-benefit ratio can be calculated. One example calculated by the researchers involved the use of ergonomic assessments with a large group of office workers. Ergonomic assessments were offered due to several workers’ compensation claims for carpal tunnel syndrome. Upper management was concerned about the cost of the assessments and the cost of ergonomic equipment (primarily high-quality keyboard trays). A single quarter in 2005 was selected for cost-benefit analysis. The tool, available on the OSHA website (U.S. Department of Labor, 2008), provides aggregate data from insurance claims to determine the direct and indirect costs of various workplace injuries and illnesses. For this example, in quarter 1 of 2005, the office had a total of 14 ergonomic assessments completed, with an average cost of $245 per assessment. This amount included the direct cost of the assessment and all equipment ordered based on assessment results as well as the indirect cost of employee lost productivity during the assessment. The average cost included assessments for which no equipment was needed and assessments that resulted in ordering multiple pieces of equipment. Each ergonomic assessment was triggered by an employee complaint. Assessments of employees complaining of bilateral wrist discomfort, which was predicted to evolve into carpal tunnel syndrome if left unaddressed, were most common.

Cost-benefit analysis showed that $3,430 in assessments and keyboard trays averted $815,668 in potential workers’ compensation costs to the company. In this case, the $815,668 of avoided workers’ compensation claims is divided by the $3,430 paid for assessments ($815,668 ÷ $3,430), resulting in a ratio of $238:$1. For every $1 spent on ergonomic assessments and equipment, the company received a $238 return or cost avoidance (Sidebar 2).

Although some may argue that cost avoidance is not actual cost data, the use of cost avoidance is common in health care and the military, where the known outcome is not certain (Bratt et al., 2010). Cost avoidance can also be applied with actual trend data (e.g., risk factor costs) to compare projected costs with and without the intervention into the future (Chenowith, 2011a).

In this case, upper management quickly decided to continue the program when the ROI for ergonomic assessments was communicated. As a side note, in 2005, 18 workers’ compensation claims for carpal tunnel syndrome were filed. By 2009, the number of cases had decreased to zero as a result of the intervention. These data further strengthened the value of this project for senior management.

When conducting cost-benefit analysis, it is important to balance the degree of accuracy for both the cost and the benefit sides of the equation. For instance, in the ergonomic assessment example, the indirect costs of the workers’ compensation claim included an estimate for loss productivity arising from the injury. Consequently, the lost time for the ergonomic assessment was included as well.

### Table 1

**Examples of Direct and Indirect Costs**

<table>
<thead>
<tr>
<th>Direct Costs</th>
<th>Indirect Costs</th>
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<tbody>
<tr>
<td>Project design</td>
<td>Employee time for participating</td>
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<tr>
<td>Facilities</td>
<td>Absentee wages</td>
</tr>
<tr>
<td>Equipment</td>
<td>Wage related to time lost through work stoppage</td>
</tr>
<tr>
<td>Staffing</td>
<td>Administrative time spent by supervisors</td>
</tr>
<tr>
<td>Marketing</td>
<td>Employee training and replacement costs</td>
</tr>
<tr>
<td>Materials</td>
<td>Replacement costs of damaged equipment and property</td>
</tr>
<tr>
<td>Staff training</td>
<td>Lost productivity related to new employee learning curves and accommodation of injured employees</td>
</tr>
<tr>
<td>Overhead</td>
<td></td>
</tr>
</tbody>
</table>

### Sidebar 2

**Cost-Benefit Analysis for Ergonomic Assessments**

<table>
<thead>
<tr>
<th>Number of ergonomic assessments</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost per assessment</td>
<td>$245</td>
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<tr>
<td>Total costs for assessments</td>
<td>$3,430</td>
</tr>
<tr>
<td>Number of carpal tunnel cases averted or avoided</td>
<td>14</td>
</tr>
<tr>
<td>Average cost of treatment per case</td>
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</tr>
<tr>
<td>Direct costs</td>
<td>$27,744</td>
</tr>
<tr>
<td>Indirect costs</td>
<td>$30,518</td>
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<tr>
<td>Total cost per case</td>
<td>$58,262</td>
</tr>
<tr>
<td>Total costs for all cases</td>
<td>$815,668</td>
</tr>
<tr>
<td>Ratio of dollars avoided to dollars spent</td>
<td>$815,668:$3,430</td>
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<tr>
<td></td>
<td>$238:$1</td>
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</tbody>
</table>
Cost-Benefit Analysis: Case Management Example

Cost-benefit analysis can be used in case management as well. Significant cost savings can result from effective case management and return-to-work programs. In a pilot study, Ramos (2006) demonstrated a reduction of lost days from 5 to 7 days before program implementation to 3 to 5 days after implementation. The estimated cost savings was $360 per case for the 2-day reduction in absenteeism. The cost savings was based on the employees' and the replacements' wages.

Mullahy (2009) related cost-benefit analysis to case management. In one example, nurse case management for a diabetic client was compared to a situation in which nurse case management was not used. In the example, a non-compliant diabetic client was admitted to the hospital twice for treatment, resulting in two 5-day stays (10 days) ($1,500 per day) for a total hospital bill of $15,000. The physician visits during hospitalization ($150 per visit) totaled $1,500. Finally, a private outpatient diabetic management program cost $1,000. This brought the total potential charges to $17,500.

Alternatively, the nurse case management intervention included a diabetic management program at a cost of $750 for 3 months. One physician visit per month ($75 per visit) for 3 months totaled $225. The total cost of this intervention with the same outcome was $975. To calculate the cost-benefit analysis, $17,500 is divided by $975, yielding a cost-benefit analysis ratio of $17.95:$1. For every dollar spent on nurse case management, the company realized a $17.95 return or cost savings.

Another example of case management savings is an occupational health nurse consultant return-to-work initiative. If restricted work is available that meets an injured employee's work restrictions and is productive work, an effective return-to-work program saves company resources by reducing absenteeism. For instance, if the consultant manages 10 active cases and returns these 10 employees to work 1 or 2 days earlier than usual, the savings can be significant. A decrease of 10 to 20 total days of absence is a direct savings of wages based on an hourly rate. If the hourly wage is $15, then the savings can range from $1,200 to $2,400, plus indirect wages for replacement employees.

Cost-benefit analysis is ideal for evaluating programs and interventions such as described above. However, cost-benefit analysis does have limitations; cost-benefit analysis cannot be used unless the variables are converted to dollars. Also, it is sometimes difficult to assess wellness programs for which projected dollar amounts may be difficult to assign. In this case, as previously discussed, other qualitative measures of service value can be used or cost-effectiveness analysis may provide a more efficient means to compare costs and outcomes.

Cost-Effectiveness Analysis

Cost-effectiveness analysis is used to compare programs based on outcomes that may or may not have monetary value. If, for example, the desired outcome is lowered blood pressure, several programs or interventions are compared to determine the least cost for the best outcome, provided all of the programs result in lowered blood pressure.

In true cost-effectiveness analysis, each program is ranked according to the effectiveness of the program in achieving desired outcomes. The cost for each program is calculated and assigned, and the cost-effectiveness ratio is determined. The program with the lowest ratio is the most cost-effective one and generally is selected. For example, intervention A costs $500 to implement and reduces employee absenteeism by 3 days annually. On the other hand, intervention B costs $900, but reduces absenteeism by 6 days. The cost-effectiveness ratio for A is $500/3 or $167:1. The cost-effectiveness ratio for intervention B is $900/6 or $150:1. As a result, although intervention B is more costly, it is also the most cost-effective intervention.

Table 2 outlines an example comparing the cost-effectiveness of two smoking cessation programs. As was the case with cost-benefit analysis, it is essential to include the same variables in both comparisons when using cost-effectiveness analysis. Although the example above examined the cost-effectiveness of two smoking cessation programs, an analysis by Wagner and Goldstein (2004) subdivided smoking cessation programs using Prochaska and DiClemente’s Stages of Change model. In this analysis, cost-effectiveness was determined based on whether the participant was in the precontemplation, contemplation, or preparation stage of smoking cessation. Once participants moved beyond precontemplation, they could not revert back to that level. Communicating this change can be used to demonstrate value. Although this example may be beyond the need of most occupational health nurses, it is important to demonstrate that program comparison can be used at any level as long as the desired outcome is the same.

OTHER EXAMPLES OF DEMONSTRATING VALUE
Value of Providing Health Surveillance

Offering health surveillance services, such as respirator clearance and fit testing or audiometric monitoring, may result in a more effective and convenient service as well as significant cost savings. The savings depend on the number of employees in the surveillance program and the cost of similar services offered by off-site providers. In addition to the number of participants in the program, other variables to document include the cost of the off-site service, travel time to drive there and back, and appointment wait time. The hourly wage rate is also needed to calculate cost benefit or savings. A cost savings estimate can be calculated from the data and compared to providing the service on-site. This comparison also needs to include the break-even point if equipment (e.g., an audiometer and an audiometric booth) must be purchased.

For example, if employees’ hourly wages are $15 and the cost of respirator clearance off-site is $75 per employee with an average wait time of 30 minutes plus a drive time of 30 minutes, the average cost is $90 per employee. If the occupational health nurse is paid $40 per hour with
no wait or drive time, then the savings is $50 per employee participant per year. If, for example, 50 employees were enrolled in the respiratory protection program, the company would realize a savings of $2,500 per year for just that one program. The productivity savings alone would be $750 per year. Plus, the occupational health nurse interacts with the employee, permitting assessment of other potential issues. The information gained and the relationship built are invaluable. The resulting quality and satisfaction value should be considered and assessed through occupational health nurse documentation, participant interviews, and surveys. Plus, limited equipment costs are dedicated to this service. This same metric can be applied to other on-site versus off-site services.

If, however, high-priced equipment, such as an audiometer, is necessary, then the equipment costs and break-even point may demonstrate the value of off-site testing with nursing time better spent on other initiatives. However, even if the break-even point may take 3 or more years, the project may still demonstrate benefits. For example, for a hearing conservation program, off-site testing costs $60 plus time away, as in the above example. If the nurse is paid $25 per half-hour, the savings is estimated at $35 per person plus $30 more in travel time, or $65 per person. For 100 employees, the savings is $6,500. The savings can be offset against the break-even point. In the example below, the break-even point would be after the second year.

Table 2
Cost-Effectiveness Comparison of Two Smoking Cessation Programs

<table>
<thead>
<tr>
<th></th>
<th>Intervention A</th>
<th>Intervention B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program design implementation (nurse, $42 per hour)</td>
<td>$336 per 8 hours</td>
<td>$42 per 1 hour</td>
</tr>
<tr>
<td>Diary and pamphlet distribution</td>
<td>$84 per 2 hours</td>
<td>$84 per 2 hours</td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program (nurse, $42 per hour)</td>
<td>$1,890 per 45 hours per 12 weeks</td>
<td>$84 per 2 hours</td>
</tr>
<tr>
<td>Diaries</td>
<td>$150</td>
<td>$0</td>
</tr>
<tr>
<td>Pamphlets</td>
<td>$60</td>
<td>$60</td>
</tr>
<tr>
<td>Indirect costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee time away ($15 per hour)a</td>
<td>$1,350 per 12 weeks</td>
<td>$60 per 4 hours</td>
</tr>
<tr>
<td>Total costs</td>
<td>$3,870</td>
<td>$330</td>
</tr>
<tr>
<td>3-month quit rate</td>
<td>15.9%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Number of employees who quit</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Estimated annual health cost savings ($750 per year)</td>
<td>$3,000</td>
<td>$1,500</td>
</tr>
<tr>
<td>Cost-effectiveness ratio for number of employees who quit</td>
<td>$968:1</td>
<td>$165:1</td>
</tr>
<tr>
<td>Cost-effectiveness ratio for health care cost of smokers</td>
<td>1.3:1</td>
<td>0.22:1</td>
</tr>
</tbody>
</table>

Note. Cost of intervention for 30 employees. aThirty employees × 15 minutes per week.

Demonstrating Value Through Wellness Initiatives

More than 75% of companies report offering some type of wellness programs. When effectively implemented, wellness initiatives consistently demonstrate a 3:1 ROI or better if multiple health risks are targeted (Goetzel, 2011; Goetzel & Ozminkowski, 2008). The type of offerings vary, with most including awareness programs and screenings. Many programs are now using health risk assessment tools and demonstrating value by changes in health risks (Merrill & Aldana, 2009). Occupational health nurse consultants can demonstrate greater savings by designing comprehensive and sustainable behavior change programs.

Demonstrating cost-effectiveness is difficult and has been inconclusive; however, several long-term studies conducted for Citibank, Dow Chemicals, and Johnson & Johnson have demonstrated ROI (Pelletier, 2011). One suggestion for measuring ROI is to assess before and after health care costs between participants and non-participants. Another suggestion is to assess absenteeism between participants and non-participants, again including before and after data for both.

Calculating actual insurance cost savings based on risk factor reduction is more complicated. The occupa-
IN SUMMARY

What Are Consulting Services Worth?
Applying Cost Analysis Techniques to Evaluate Effectiveness
Mastroianni, K., & Machles, D.
Workplace Health & Safety 2013; 61(1), 31-41.

1 Services provided by internal and external occupational health nurse consultants assist companies with strategies to help prevent injuries, improve employee well-being, control health care and injury costs, reduce absenteeism, and increase retention.

A systematic approach is necessary to demonstrate value of occupational health nurse consulting services, including ascertaining the issue or concern; identifying the desired outcome and appropriate measures; implementing the appropriate solution or service; establishing a system for collecting, documenting, and analyzing data; and evaluating and communicating the results.

3 When appropriate, cost analysis techniques such as cost-benefit analysis and cost-effectiveness analysis can be applied to demonstrate monetary value. These methods require consistent documentation of direct and indirect costs and savings. Several examples were provided, including ergonomic services, wellness initiatives, case management, and medical surveillance.

ducing unplanned absenteeism can result in significant cost savings for a company by reducing both direct and indirect costs. Wallace (2009) estimated the cost of unplanned absence to be, on average, $755 per employee per year. Determining the most common causes of absenteeism and designing interventions to reduce days away from work can result in significant cost savings. As discussed previously, lowering absenteeism by 2 days per person yields meaningful savings.

Pelletier (2011) provided a comprehensive review of cost-benefit analyses of workplace health promotion programs published between 2008 and 2010. In this eighth research literature review, 27 programs met the criteria. These comprehensive programs were ongoing, integrated health promotion and disease management based on corporate objectives, and included program evaluation of clinical or cost outcomes. The author acknowledged that the quantity and quality of published research have increased significantly in recent years. The studies reviewed varied in design and outcome evaluation. Most targeted risk reduction and behavior change programs used before and after health risk assessments or surveys. Two of the studies assessed program impact on productivity and several assessed reduction in absenteeism. As discussed earlier, reducing absenteeism by 1 or 2 days per employee through disease management can result in significant cost savings. To calculate the cost-benefit analysis required the cost (i.e., average days of absenteeism before the initiative and average time spent managing each case) and the savings (i.e., average days of absenteeism after the initiative).

CONCLUSION

Whether internal or external to the organization, establishing the value of an occupational health nurse consulting service is essential. Occupational health nurses contribute significantly to the health of employees as well as the organization. However, this contribution will not be recognized unless it is demonstrated, documented, and communicated. This article discussed qualitative and quantitative evaluation options, including cost analysis techniques. Several examples were provided using typical occupational health nursing roles and responsibilities in the United States. The cost implications of valuing health and safety initiatives are not new; however, it is more important than ever to establish the value of services. Occupational health nurses can establish value by documenting outcomes and showing how services support the business mission and goals.

In the current corporate environment of limited resources, a balance of quality services with an ability to manage costs is needed. Therefore, it is necessary for occupational health nurses to become cost savvy so they can respond to cost-containment initiatives and demonstrate the contribution of health and safety activities to the corporate mission and goals. A growing sentiment heard in workplaces today is that if a service provider cannot demonstrate the benefits of the service, it is not worth doing, regardless of how well the service is performed. Now is the time to determine not only whether occupational health nurse is entitled to the aggregate claims data from the insurance carrier; however, securing these data in an appropriate form may be challenging. Access to these data should be negotiated when a new benefits package is being considered. The occupational health nurse consultant can be instrumental in recommending benefit plan packages and negotiating data reports. Another option is to use proxy data from the literature, as mentioned earlier. Websites of the American Heart Association, American Cancer Society, National Institute of Cancer, and Diabetic Association publish risk factor data. Chenowith (2011b) published risk factor calculation summaries. However, the outcome depends on the sources because variation can be significant. For example, statistics for cost savings after an individual quits smoking vary from $579 to $1,500 per year. A conservative estimate is recommended, or the consultant can report the range found and use the halfway point to calculate cost savings.

Disease management programs have been shown to save companies money by reducing lost workdays. Re-
health nursing tasks are of value, but how that value is established and communicated. Perhaps the question is, if value cannot be demonstrated, is the nurse willing to let it go and consider what other services might be more worthwhile for all stakeholders?

From an economic standpoint, the outcomes of occupational health nurse consulting services are:

- Reduced absenteeism.
- Decreased attrition and employee orientation costs.
- Reduced workers’ compensation claims and insurance costs.
- Increased efficiency and production.
- Improved employee morale and work force development.
- Improved corporate social responsibility.

REFERENCES


Mastroianni, K. (2012). Do work relationships matter? Instrumental case study on characteristics of workplace interactions that enhance or detract from employee perceptions of well-being & health behaviors (Dissertation). Retrieved from www.lib.ncsu.edu/resolver/1840.16/7568


